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Ridgway also describes *Cancroma zeledoni*, from Central America, and *Rupornis gracilis*, from Yucatan.——L. Steyneger describes (*l. c.*) a new species of tree-sparrow (*Passer saturatus*) from the Liu-kiu islands.——José C. Zeledon contributes to the Proc. U. S. Nat. Mus., a list of the birds of Costa Rica, 692 species in all.——L. M. Turner gives (*l. c.*, 233) a list of the birds of Labrador from Hudson strait to the Gulf of St. Lawrence, and west to 82° W. long., 764 species in all.

Mammals.—F. W. True (Proc. U. S. Nat. Mus., 1885, 95) describes as new *Phocæna dalli*, and reduces the previously described species of porpoise to three, viz: *P. communis*, *P. lineata*, and *P. spinipinnis.* In coloration, in the form of the head, and in the much larger number of vertebræ, *P. dalli* approximates Lagenorhynchus. A cordate area of white occupies the belly and lower half of the sides; the beak is shorter and the temporal fossæ smaller than in *P. communis;* the vertebræ are ninety-seven or ninety-eight in number, instead of sixty-six, as in *communis*, and the dorsal fin is concave on its posterior margin. The Aleuts, according to W. H. Dall, recognize this species as distinct from the smaller *P. vomerina* (= *communis ?*).

EMBRYOLOGY.[1]

THE DEVELOPMENT AND STRUCTURE OF MICROHYDRA RYDERI POTTS.—The discovery and prolonged observation in the living state of this remarkable fresh-water cœlenterate, which is obviously allied to Hydra, is due to the painstaking care of Mr. Edward Potts, who found it adherent to stones to which fresh-water Polyzoa were attached, which he brought from Tacony creek, near Philadelphia. Mr. Potts has named the animal for the writer,[2] to whom he has also turned over three series of sections, prepared by Mr. Harold Wingate, from three individuals. Fortunately two of these series of sections, one a slide containing forty-two transverse, and another nine longitudinal sections, enables me to make a very thorough comparison with the structure of Hydra as displayed in a series of sections of *H. viridis* and *H. fusca*, from both of which Microhydra differs not only in size but also in histological details as well as in its mode of development. This singular organism also differs widely from the marine *Protohydra leuckartii* Greef, in being very much smaller, and in being an inhabitant of fresh water; it also differs from Protohydra in its method of reproduction by gemmation from the side of the body instead of by transverse fission. In this last feature, or in respect to its gemmiparous development, Protohydra agrees with the Acraspeda or Discophora, in multiplying by transverse fission, such as is seen in the asexual Strobila stage of the latter. In one important feature Protohydra and Microhydra agree, namely, in that neither form possesses the slightest traces of tentacles. The widely different habitats of the two forms, as well as their diametrically opposite methods of gemmiparous reproduction, leads me to the conclusion that they are not very closely related. Its affinities are clearly with Hydra, but that it cannot in any sense be regarded as a mere stage of the development of the latter, follows from other considerations which I will now state.

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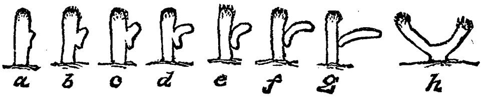
[1] Edited by JOHN A. RYDER, Smithsonian Institution, Washington, D. C.

[2] *Science*, Vol. v, 1885, No. 123, in the accompanying cover sheets, called the *Science Bulletin*, p. v, under the head of Recent Proceedings of Societies, the name *Microhydra ryderi* was first published, together with a brief account of its structure and habits, as a report of a verbal communication made by Mr. Potts at the meeting of the Academy of Natural Sciences of Philadelphia, held May 19, 1885.

Its minuteness might very readily lead to its being overlooked. It measures alive $.5^{mm}$ in height; the longitudinal sections in my possession are somewhat shorter, or about $.475^{mm}$ in length, a difference probably due to contraction. Its diameter at the oral end is somewhat greater than at the base, and ranges from about $.15$ to $.175^{mm.}$ In fractions of inches its dimensions are: height $\frac{1}{50}$ inch, diameter of body $\frac{1}{160}$ inch, constituting it the most diminutive adult hydroid or cœlenterate type yet known, so that its generic name is especially appropriate. In life the animal is very much less contractile than Hydra, and is without the well-defined pedal disk of the latter or of Protohydra.

No sexually mature individuals of Microhydra have been found by Mr. Potts, who has, however, most laboriously and carefully studied the gemmiparous or asexual reproduction of the species in the living animal, he having been able, in fact, to watch this process in several successive generations. The asexual reproduction of Microhydra is, however, so very different from that of Hydra that there can again be no doubt of the absolute distinctness of the two forms in question. In Hydra the gemmiparously produced young animal, which is budded from the sides of the body, soon becomes pyriform, buds out tentacles and is constricted off from the parent by transverse fission around its base or pedal disk. In Microhydra a very different method of lateral gemmation occurs, since the bud very soon becomes sausage-shaped instead of pyriform, but it grows out from a swelling or thickening at the side of the parent the same as in Hydra. In Microhydra a constriction or furrow appears at either end of the young bud as soon as it is well defined as such. The gradual progress of the development of a bud is shown in Figs. *a, b, c, d, e, f* and *g*. The last shows the young Microhydra in the act



Microhydra ryderi.

of being detached from the parent. These figures are from sketches by Mr. Potts as the process was watched by him at different stages. It is clear from these figures that the process of gemmation in Microhydra is very different from that seen in other hydroids; it is, in fact, as if both ends of the young polyp were being budded out of the side of the parent simultaneously, final separation of the bud occurring at one of its sides instead of at its base. The process thus actually makes something of an approach toward longitudinal instead of transverse fission.

The bud after detachment drops down upon an adjacent surface and for a time lies quite prone upon its side. It is entirely without cilia, in this respect resembling the larvæ of Hydra. It, however, seems possessed of slight powers of locomotion, which is effected probably by the contractions of the body. After lying in its prone position for a time, the vermiform body of the polype becomes fixed to the foreign object upon which it rests, by one end, while the other end is slowly raised into the erect position, when it may be said that the creature is adult. The history of the internal changes which the larva undergoes while budding are not known, but it is probable that the bud has the oral opening developed at its free end by the time it assumes the erect position.

Colonies of two have been observed by Mr. Potts, appearing somewhat as in the sketch in Fig. *h*. This indicates that Microhydra in common with all other Cœlenterata has a tendency to form compound individuals or corms. Whether the stomachs of such compound individuals open into one another has not been ascertained, but it is extremely probable that they do. The preceding evidence, taken as a whole, it seems to me, leaves absolutely no doubt respecting the distinctness of the remarkable little organism discovered and so patiently studied by Mr. Potts.

The structure of the body in the Hydra and Protohydra agree pretty closely; in both there is an outer ectodermal layer, throughout which the nematocysts are pretty uniformly distributed. Under the ectoderm of both there is a thin layer consisting of contractile processes of the ectodermal cells. The endoderm consists in both of large vacuolated cells, containing excentrically placed nuclei and great numbers of granules at their inner ends. These large vacuolated, endodermic cells seem to line the whole internal cavity in both of the genera named.

In Microhydra the structure of the body is different from either of the preceding. There is a thin outer ectodermal layer, but the nematocysts are mainly aggregated at the oral end of the creature, few being present on the sides. Under the ectoderm there is a barely discernible thin stratum consisting very probably of the contractile processes of the outer layer cells. Around and just within the lips of the oral aperture the endodermic cells are solid. Just below the oral opening and for about one-third the length of the animal, the endodermic cells are large and vacuolated as in Hydra, but the excentrically placed nuclei are absolutely and relatively very much smaller than in Hydra. There is a gastric cavity extending down from the mouth for about the same distance, below which the alimentary cavity becomes less apparent and is surrounded by solid endodermic cells. These details are shown in both the longitudinal and transverse sections. In the cross-sections evidences of slight irregular foldings of the endoderm are present as in Hydra.

Greef has described a homogeneous cuticula covering the basal part of the ectoderm of Protohydra. A similar homogeneous cuticula seems to loosely invest the ectoderm in the sections of Microhydra. Mr. Potts, however, is not disposed to agree with me on this point, as he informs me by letter that he was unable to detect any such envelope in the living larvæ studied by him.

There is a distinct but small oral opening at the upper end of Microhydra, which is cleft-like or irregular, through which food is taken in, as observed by Mr. Potts. The gastric cavity is small and only the upper end of it appears to possess a specially developed digestive function. The digestive cavity of Microhydra is, in fact, but little more developed than in the later planula-stage of such a form as Eucope. In fact, if the planula of the latter were to lose its cilia, become fixed and acquire a mouth, the morphological complexity of Microhydra would be realized. We have then in Microhydra an adult type which represents practically a planula which has acquired a mouth. In other words, the new type is not only the simplest of Hydroids, but is also the simplest of all true polypes or Cœlenterata. It is, in fact, a much more rudimentary form than even Protohydra, and represents perfectly a permanent gastrula which reproduces itself by lateral gemmation instead of by transverse fission.

It has been contended by some that Hydra is a degenerate form, and that Protohydra and Microhydra must be considered in the same light. As no very cogent reasons have ever been adduced in support of such a conclusion, I shall leave the *onus probandi* to be produced in favor of that view by those with whom it originated. The very simplicity of the type in question, it seems to me, must ever remain a serious bar to arriving at any very certain conclusions on this head. It seems as impossible to me to prove that Microhydra has been developed by the degeneration of a higher type, as it does to prove that it is a form which has advanced but very little beyond the planula stage of the Cœlenterata. The latter view seems to me to be by far the most probable, since it is a free-living form, which is no more likely to have been adversely affected than would hundreds of others living in the same environment. The significance of this singularly interesting type in relation to the question of the possible origin of the Cœlenterata is very great, and the interest which attaches to it from the standpoint of the embryologist, it seems to me, fully warrants its discussion in this department.

With the help of Mr. Potts, who has generously given me permission to do so, I propose at an early date to prepare a more extended paper on this organism, with good illustrations. As it is, I must express my great obligations to its discoverer for the free use of many of the facts detailed above.—*John A. Ryder.*

[As this note on Microhydra goes to press, I have met with a paper[1], published in the Proceedings Royal Society, London, Vol. XXXVIII, No. 235, Dec. 11th, 1884, pp. 9–14. According to this account, the supposed hydroid phase of Limnocodium is without tentacles; it was found attached to roots of Pontederia in the tanks of the Royal Botanic Society, Regent's park. The figures given by Bourne of the suspected hydroid phase of the singular fresh-water Medusa known as Limnocodium, are certainly very similar to Microhydra, but the former is larger than the latter and measures from $\frac{1}{60}$th to $\frac{1}{8}$th of an inch long. Colonies of three or four individual zoöids were frequently met with. No true perisarc or cuticula was observed as in Microhydra, but the surface is covered with particles of mud and other *débris*, which becomes glued together by some secretion of the animal, and forms a sort of tubular casing. In internal structure this hydroid stage of Limnocodium differs considerably from Microhydra, however, judging from Bourne's description and figures. Is it possible after all that Microhydra is only the hydriform stage of fresh-water Medusa? If so, it is very probable that it may be allied to Limnocodium, the latter of South American origin, has in all probability a very different life-history from the North American Microhydra, if we may go so far as to assume that the latter has a medusiform adult stage. No lateral budding and dehiscence has been observed to occur in the supposed hydroid phase of Limnocodium, such as takes place in Microhydra, besides the larger zoöids of the former were over six times as long as those of the latter, otherwise there are many striking similarities. Notwithstanding the existence of these resemblances, I think we may assume that if Microhydra should turn out to be only the hydroid stage of a mature medusa-form the latter will be found to be generically distinct from Limnocodium, in which case it might be called Pottsia.—*J. A. R.*]

PHYSIOLOGY.[2]

RECENT BELIEFS CONCERNING CELL-STRUCTURE.[3]—Probably no branch of biology has been so richly developed during the last five years as that which concerns the intimate physical and chemical

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[1] On the Occurrence of a hydroid phase of *Limnocodium sowerbii* Allman and Lankester, by Alfred Gibbs Bourne.

[2] This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.

[3] *La Biologie Cellulaire*, par le Chanoine J. B. Carnoy, Lierre, 1884.